Service Manual

ensoniq®

Acoustic Wave Piano

sound by BOSE®

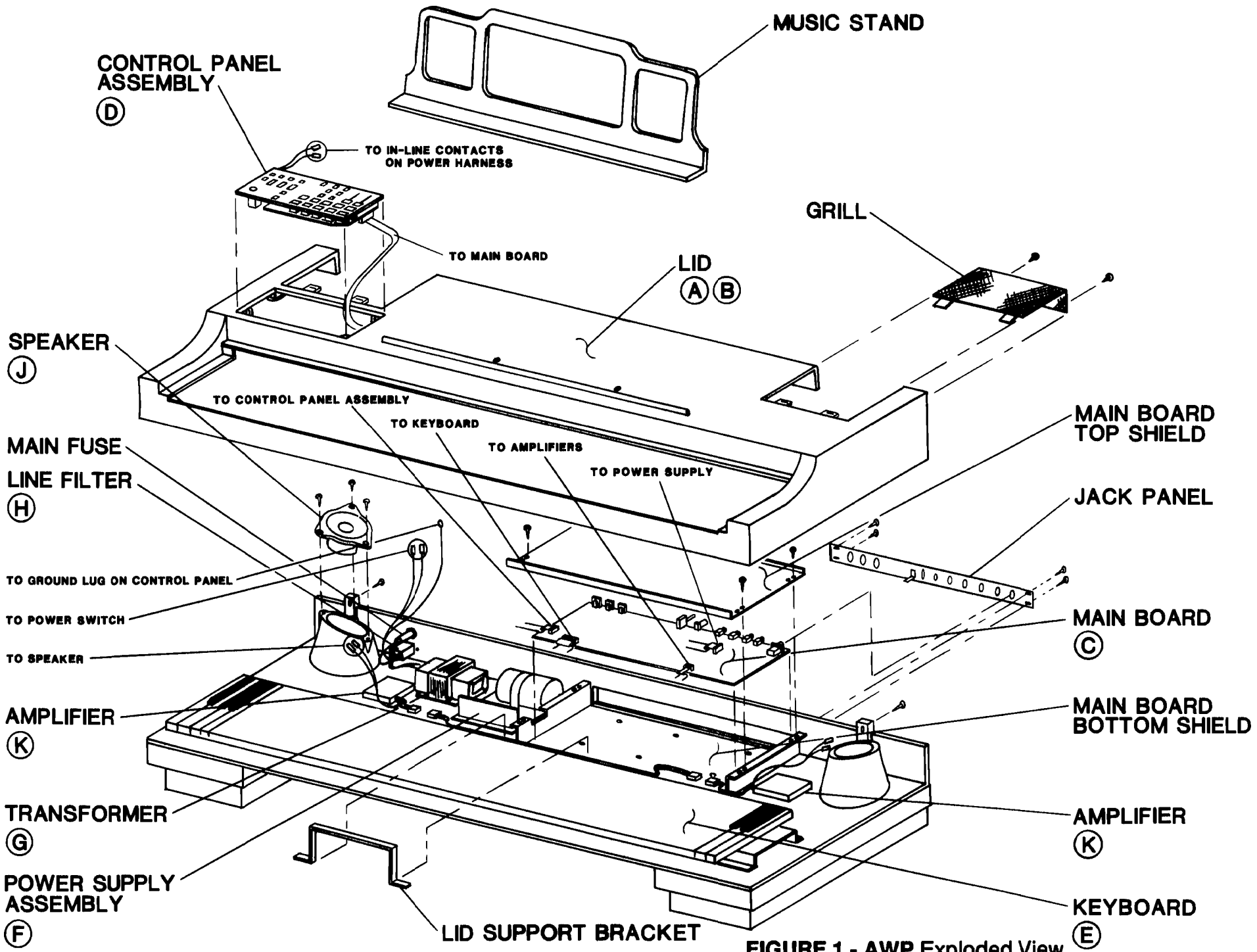

FIGURE 1 - AWP Exploded View

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Tools Needed:

- One Flat Head Screwdriver
- One Large Phillips Screwdriver
- One Small Phillips Screwdriver
- One Multimeter
- One MIDI Cable
- Two Clip Leads
- Headphones
- Cloth

As with every ENSONIQ product, all **AWP** service will be handled through the ENSONIQ Module Exchange Program. Rather than diagnose and exchange individual components, you will replace complete modules. We feel that this is the most time and cost effective method of repair, both for you and your customers.

CHECKING THE POWER SUPPLY

Many **AWP** problems may be related to a faulty Power Supply, Transformer or Line Filter. You should check these before troubleshooting the rest of the unit. **Figure 2** shows the check points for reading the AC Line Voltage. **Figure 3** shows the connector terminal numbers for the Power Supply and Transformer. It is normal for Line Voltage to vary +/- 10%.

Remove the lid (see **Section A**, page 10). Check to make sure that all the cable connections are secure and correct. Plug the **AWP** in and turn it on. After the **AWP** has warmed up for five minutes, begin to test the voltages at the points shown in **Figures 2** and **3**. If the voltages vary outside the allowable limits, follow the procedure described under **TESTING THE POWER SUPPLY UNLOADED** before replacing it.

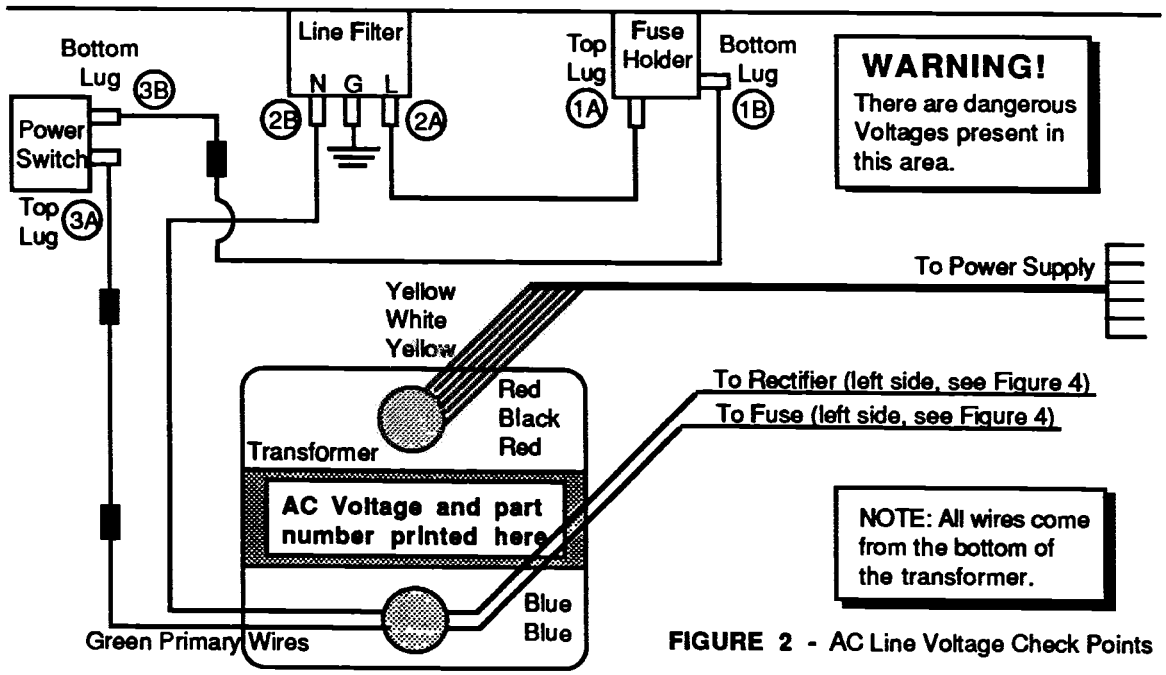


FIGURE 2 - AC Line Voltage Check Points

AC LINE VOLTAGE MEASUREMENTS (See Figure 2)	
With the power switch OFF, the proper AC Line Voltage should read from: 2B-1A, 2B-2A, 2B-3B	With the power switch ON, the proper AC Line Voltage should read from: 2B-1A, 2B-1B, 2B-3B, 2B-3A There should be no voltage across the power switch.

TRANSFORMER AND POWER SUPPLY PART NUMBERS

All AWP systems use the same Power Supply (part number 4090008601 silk-screened on the lower left of the Power Supply PC board). The Transformer voltage and part number is labeled when shown in **Figure 2**. If you suspect a problem with the Power Supply and the labels on the Transformer and Power Supply do not correspond to the configuration below, contact the ENSONIQ Customer Serivice Department for instructions.

Voltage	Transformer
100V	1450000522
115V	1450000702
220V	1450000712
240V	1450000732

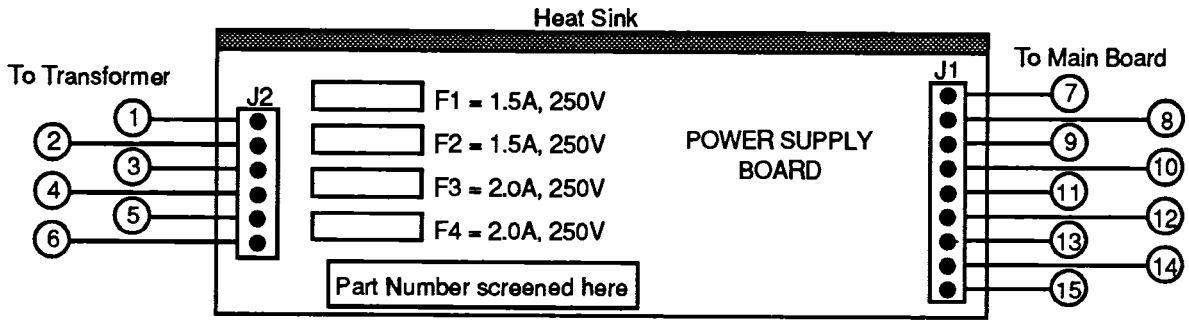


FIGURE 3 - Power Supply Voltage Check Points

The following chart lists the voltage ranges for proper operation of each supply (fully loaded) and the appropriate terminals across which to read with the volt meter (refer to **Figure 3** for terminal locations):

Designation	Terminals +	Terminals -	Connector	Allowable range	Units
Analog Supply	1	2	J2	29.3 to 38	VACrms
Digital Supply	5	6	J2	15.3 to 19.5	VACrms
+12A	7	8	J1	+11.4 to +12.6	VDC
-12A	9	8	J1	-11.4 to -12.6	VDC
+5 Analog	11	8	J1	+4.75 to +5.25	VDC
Reset	12	10	J1	+3.5 to +5.25	VDC
+5 Memory	13	10	J1	+4.75 to +5.25	VDC
+5 Digital	15	14	J1	+4.75 to +5.25	VDC

TESTING THE POWER SUPPLY UNLOADED

If the Power Supply readings exceed the indicated tolerance (particularly the +5 Digital line between terminals 15 and 14 or +5 Memory line between terminals 13 and 10) it is possible that a defective component on the Main Board is drawing the Power Supply down. In this case, you should test the Power Supply unloaded before proceeding. To do so, follow this procedure: Turn the unit OFF and remove the connector from **J1** on the right side of the Power Supply, leaving only the connector from the Transformer attached at **J2**.

Voltages should read as in the chart above. If these readings are normal when the supply is unloaded, then this usually indicates a problem with the Main Board or Control Panel.

AMPLIFIER POWER SUPPLY

The power supply for the amplifiers in the **AWP** is separate from the rest of the electronics. The supply consists of a fuse, bridge rectifier and a very large capacitor. The voltage from this supply is fed to the amps via a relay, which protects the speakers from power switching transients. The following chart lists the voltage range for proper operation and the appropriate terminals to read across with a volt meter (see **Figure 4** for terminal locations).

Designation	Terminals		Allowable range	Units
	+	-		
Amplifier Supply	1	2	9.6 to 12.9	VACrms
+VAmp	10,5,6	9	+11.8 to +15.9	VDC
+VAmp	3,4	9	+11.8 to +15.9	VDC
+5 Memory	7	8	+4.75 to +5.25	VDC

The relay is controlled by the +5 Memory line. Whenever the **AWP** is powered, the relay closes, supplying voltage to the amplifiers. If the amplifier voltage is present on the relay inputs (lugs 5 and 6) and voltage is present on the relay coil (lugs 7 and 8), the amplifier voltage should be present at the relay outputs (lugs 3 and 4).

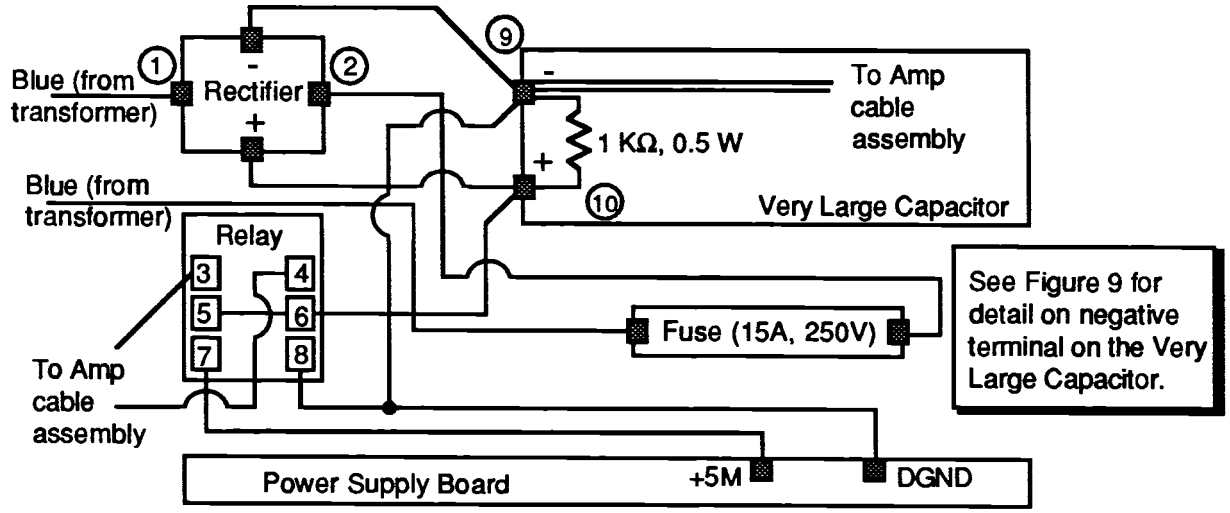


Figure 4 - Amplifier Power Supply

If the voltages exceed the allowable range, unplug lugs 3 and 4 of the relay. If the voltage returns to normal, this indicates a problem in one or both amplifiers.

RE-SETTING THE AWP

As you know, the **AWP** is really a computer – a computer disguised as a keyboard instrument, but a computer nonetheless. In fact, the **AWP** actually has more processing power than most personal computers. If you have used a computer, you should be familiar with the need to occasionally re-boot your system when you get an "error" message. Re-setting the **AWP** is the equivalent of re-booting your computer.

Why Re-set?

There are a number of things that can happen to the **AWP** (or any computer system) which might scramble the system software – voltage surges, power failures, static electricity, etc. As with any computer, some unforeseeable event or combination of events can cause the software to become confused, with strange and unpredictable results. If the **AWP** is otherwise behaving normally, you may not need to service the unit, but simply re-set it.

WARNING: Re-setting the **AWP** will completely erase all Digital Recorder memory and any other information that is normally remembered after the power is turned off.

To Re-set the AWP:

1. Make sure none of the keys are down.
2. While holding down the TUNING button, press the MIDI button.

If the instrument will not respond to any button presses or will not turn on at all, follow the procedure below:

1. Turn the **AWP** POWER switch off.
2. Hold both foot pedals down.
3. While holding down both foot pedals, turn the POWER switch on.
4. Within 1 second, release both foot pedals.

TROUBLESHOOTING GUIDE

When troubleshooting an **AWP**, always disconnect any other devices which may be connected to it. This will prevent another device from complicating your troubleshooting.

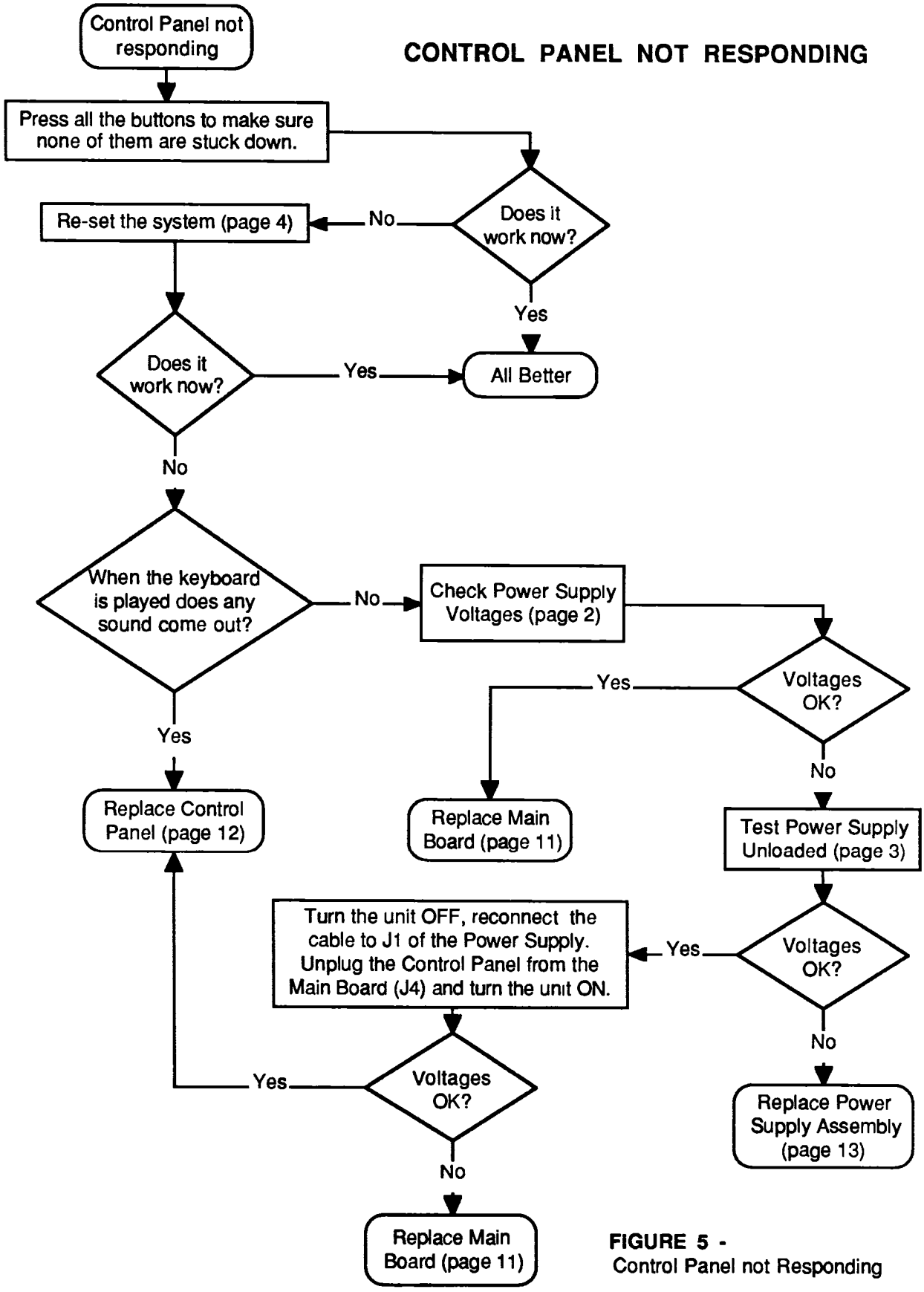

CONTROL PANEL NOT RESPONDING
Control Panel not responding
Press all the buttons to make sure none of them are stuck down.
Does it work now?
No
Re-set the system (page 4)
Yes
All Better
Does it work now?
Yes
No
When the keyboard is played does any sound come out?
No
Check Power Supply Voltages (page 2)
Voltages OK?
Yes
Replace Main Board (page 11)
No
Test Power Supply Unloaded (page 3)
Voltages OK?
Yes
Turn the unit OFF, reconnect the cable to J1 of the Power Supply. Unplug the Control Panel from the Main Board (J4) and turn the unit ON.
No
Replace Power Supply Assembly (page 13)
Yes
Replace Control Panel (page 12)
Voltages OK?
No
Replace Main Board (page 11)

FIGURE 5 -
Control Panel not Responding

NO SOUND OR DISTORTED SOUND

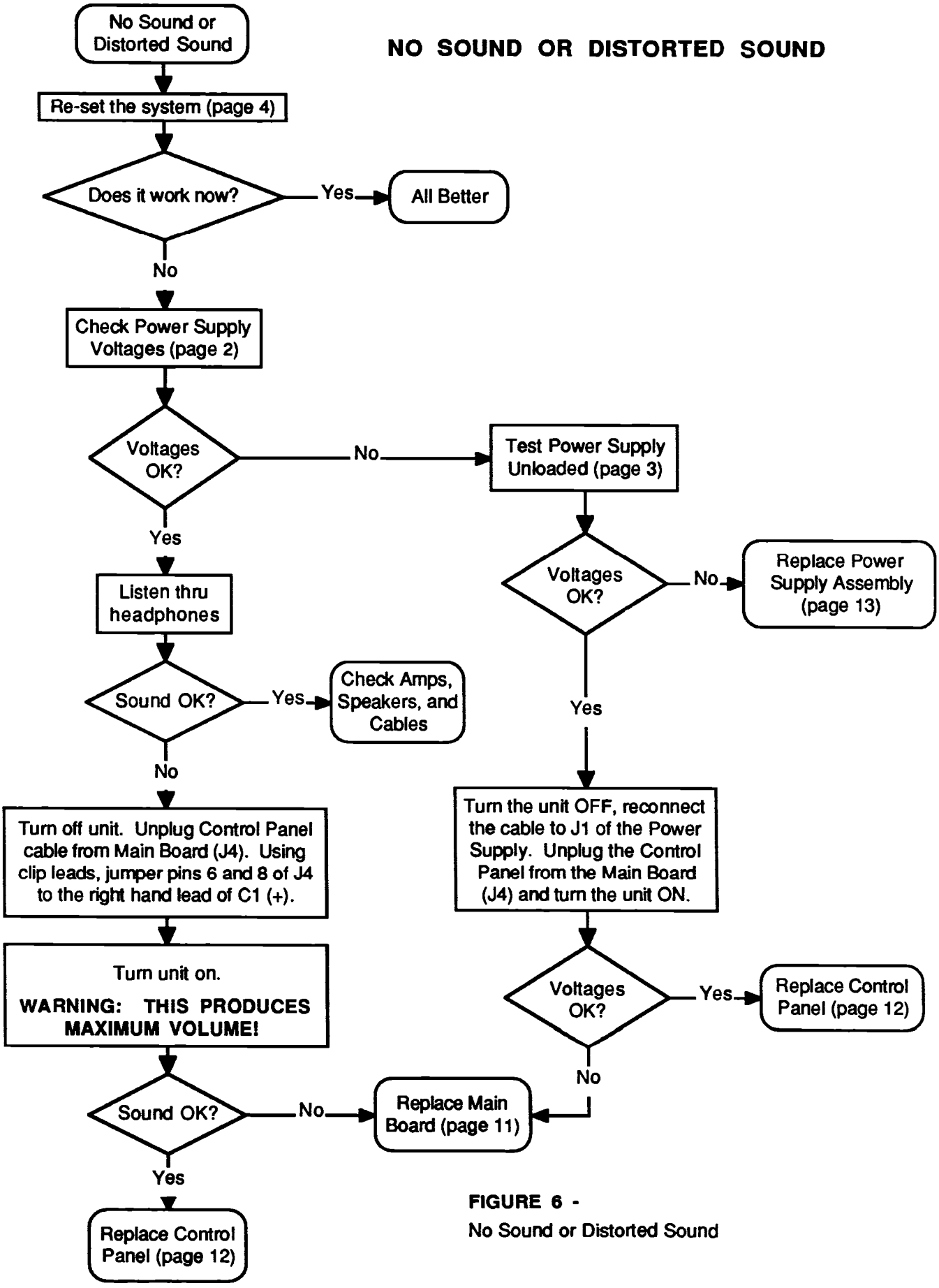

No Sound or Distorted Sound
Re-set the system (page 4)
Does it work now?
Yes
All Better
No
Check Power Supply Voltages (page 2)
Voltages OK?
No
Test Power Supply Unloaded (page 3)
Yes
Listen thru headphones
Sound OK?
Yes
Check Amps, Speakers, and Cables
No
Turn off unit. Unplug Control Panel cable from Main Board (J4). Using clip leads, jumper pins 6 and 8 of J4 to the right hand lead of C1 (+).
Turn unit on.
WARNING: THIS PRODUCES MAXIMUM VOLUME!
Sound OK?
No
Replace Main Board (page 11)
Yes
Replace Control Panel (page 12)
Voltages OK?
No
Replace Power Supply Assembly (page 13)
Yes
Turn the unit OFF, reconnect the cable to J1 of the Power Supply. Unplug the Control Panel from the Main Board (J4) and turn the unit ON.
Voltages OK?
Yes
Replace Control Panel (page 12)
No

FIGURE 6 -
No Sound or Distorted Sound

AWP TEST PROCEDURE

The following procedure will ensure the thorough testing of the **AWP** and will also aid in troubleshooting the unit. To perform the following tests you will need a short MIDI cable and a pair of headphones.

1. **Power Up**
   A. Turn unit on. The GRAND 1 LED should light.
   * **If the LED does not light, see flowchart on page 5.**

2. **Sound Check**
   A. Using GRAND 1 and ACOUSTIC BASS, play a bit to check sound quality. Play a chromatic scale to verify that the GRAND 1 pans from left to right and that all of the keys work. Hold the sustain pedal down and play twelve notes, listen carefully for distorted voices.
   B. Verify that the Volume and Brightness sliders work properly.
   * **If there are any sound problems, see flowchart on page 6. If one or eight keys do not work, a Keyboard problem is indicated.**

3. **Headphone Test**
   A. Plug headphones directly into the HEADPHONE jack.
   B. Play a few notes to check for stereo.
   C. Make sure that the speakers are silenced when the headphones are plugged in. There should be no loud pops when the headphones are inserted or unplugged.
   D. Unplug the headphones.
   * **If there are problems with the headphones but not with the speakers, this would indicate a problem in the cabling between the Main Board and the Control Panel.**

4. **MIDI Test**
   A. Connect *MIDI In* to *MIDI Out* with a MIDI cable.
   B. Hold down a few keys.
   C. Disconnect one end of the MIDI cable.
   D. When you release the keys, the notes should sustain.
   E. Play twelve or more keys simultaneously to re-initialize the voices.
   * **Failure indicates a Main Board problem.**

5. **Foot Pedal Tests**
   A. Verify that the Sustain and Sostenuto pedals work properly.
   * **Failure indicates a Main Board problem or a problem in the Foot Pedal/cable itself.**

6. **Button Test**
   A. Press all the buttons with LEDs, except for RECORD, and verify that each LED lights. Note that the MIDI button will only light while it is being pressed, and that the PART buttons (**AWP-5000** only) will flash when they are pressed.
   B. Press METRONOME and verify that it sounds. Press METRONOME again to turn it off.
   C. Hold down the TUNING button and the up arrow button at the same time. Repeatedly play the same note on the keyboard and verify that the note *slowly* increases in pitch.
   D. Hold down the TUNING button and the down arrow button at the same time. Repeatedly play the same note on the keyboard and verify that the note *slowly* decreases in pitch.
   E. While holding down the TUNING button, press the METRONOME button to return to the default tuning (A 440 Hz).
   * **Failure indicates a Control Panel problem.**

7. **Sequence Test (AWP-4000/5000** only)
   A. Press SONG SELECT, then press GRAND 1.
   B. Hold down RECORD and press PLAY to create a short sequence. The RECORD LED should be lit while recording.
   C. Press STOP and verify that the RECORD LED turns off.
   D. Press the SONG ERASE button and verify that the display changes while the button is pressed. *Do not* erase any songs at this time.
   * **Failure indicates a Main Board problem.**

8. **Memory Backup Test (AWP-4000/5000 only)**
   A. Toggle the power switch off and on 5 times, then leave the power off for 10 seconds.
   B. Power up the unit, press SONG SELECT, then press GRAND 1.
   C. Press PLAY and verify that the sequence you created is still intact.
   D. Press SONG SELECT again to exit song mode.
   * **Failure indicates a Main Board problem.**

9. **Checking the Software Version**
   From time to time, the operating software in the **AWP** may be improved by the factory. When relating a problem to ENSONIQ Customer Service, it is often useful to know what version of the operating software is being used. The software version can be determined by performing the following procedure:

   A. While holding down the TUNING button, press the CHORUS button.
   B. The MIDI LED shows the major level and the CHORUS LED shows the minor level. The MIDI LED will blink once for each major level revision, then the CHORUS LED will blink once for each minor level revision. The sequence will then repeat. For example, if the MIDI LED blinks two times, then the CHORUS LED blinks five times, this would indicate that the software version is revision level 2.5.

CARE OF THE AWP

In order to maintain the quality of the **AWP** finish during the entire life of the product, we recommend that you use a clean damp cloth to clean the **AWP** cabinet. It is also safe to use an ammonia and water based cleaning product such as Windex®. Lint and dust can be removed from the Speaker grills with a vacuum cleaner.

PLACEMENT OF THE AWP

While the **AWP** will perform well in a variety of acoustic settings, the three-dimensional sound effect provided by the BOSE Direct/Reflecting® technology is optimized when the back of the **AWP** is placed approximately three inches from a wall and the unit is placed under a seven to ten foot ceiling. In order to insure a more balanced bass response from the **AWP** system, you should avoid placing the unit in or near corners of a room.

These placement guidelines are only suggestions. As with any acoustic instrument, the placement will affect it's sound.

SOFTWARE NOTES

AWP-3000 Version 1.03:
- Fixed the metronome dropout and the single rank harpsichord demo.

AWP-3000 Version1.04:
- Fixed the vibes chorus algorithm. The left-right panning was reversed and chorus was removed from the acoustic bass demo.

AWP-3000 Version 1.05 and AWP-4000/5000 Version 1.01:
- The metronome tempo is now saved while a demo plays.
- Record and Play works immediatedly after soft reset.
- Effects settings are saved on parts after play•stop.
- The RAM is properly preserved on power down.

AWP-3000 Version 1.06:
- Transpose up properly wraps all keys outside of the 88 note range.

AWP-3000 Version 1.08 and AWP-4000/5000 Version 1.03:
- Includes new voice parameters for GRAND 1 and both electric pianos.

AWP-3000 Version 1.10 and AWP-4000/5000 Version 1.06:

- Includes new soft and medium velocity tables.
- Fixed soft pedal so it won't make the sustain pedal go up.
- Velocity averaging was fixed.
- Pedals are debounced with a 20msec debounce timer.
- MIDI Local on/off toggle was added (while holding down MIDI, press GRAND 1).

AWP-3000 Version 1.11 and AWP-4000/5000 Version 1.07:

- Code space optimization in 1.10 created a bug. The LED update is fixed.

AWP-3000 Version 1.12 and AWP-4000/5000 Version 1.08:

- GRAND 1 and GRAND 2 parameters were changed to reduce "peaky" lower middle range of keyboard The filter envelope velocity response is less exponential and more linear.

HARDWARE NOTES

INTERMITTENT START-UP

In some cases, a noisy reset output from the LM2925 regulator on the power supply board can lead to intermittent start-up (sometimes the unit won't always come up the first time it is switched on). A capacitor was added to the power supply board to correct this. If you have a unit which exhibits an intermittent start-up problem and the capacitor is NOT present on the power supply board (see **Figure 6A**), a 470pF capacitor should be added as shown, tack soldered from the right leg of C10 to the right leg of R1.

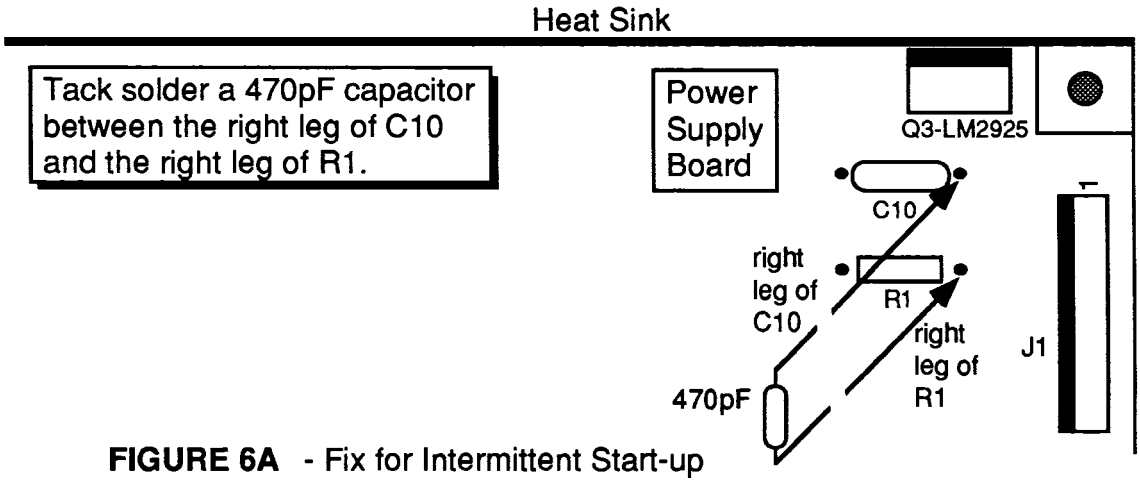


FIGURE 6A - Fix for Intermittent Start-up

SECTION

A

Removing the Lid

1. Remove all cables connected to the **AWP**, including the Power cable.
2. Remove the music stand.
3. Remove the six M4 x 13mm screws (see **Figure 10**) from the small holes in the front under side of the Top Assembly (see **Figure 7**, bottom view).
4. Remove six M4 x 46mm screws from each side of the Top Assembly (see **Figure 7**, bottom view).
5. Remove the seven M4 x 13mm screws from the back of the Top Assembly (see **Figure 7**, back view).
6. Remove one M3 x 6mm screw from the center of each Speaker grill (see **Figure 7**, back view). Place a cloth on the lefthand-side of the Keyboard.
7. Carefully lift the rear of the Lid approximately 45 degrees.
8. Remove the Control Panel (which is held in place by ball studs):
   a) Gently but firmly press on each corner of the Control Panel from the under side of the Lid.
   b) Once the Control Panel is loose, feed it through the opening in the Lid and place it carefully onto the cloth on the Keyboard.
9. Carefully lift the Lid off the unit.

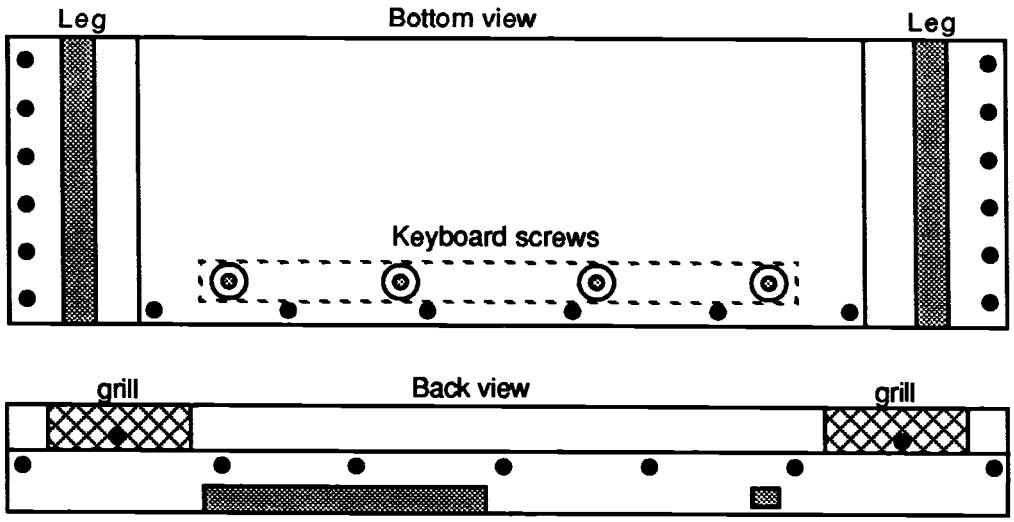


FIGURE 7 - Lid Screws

SECTION

B

Re-attaching the Lid

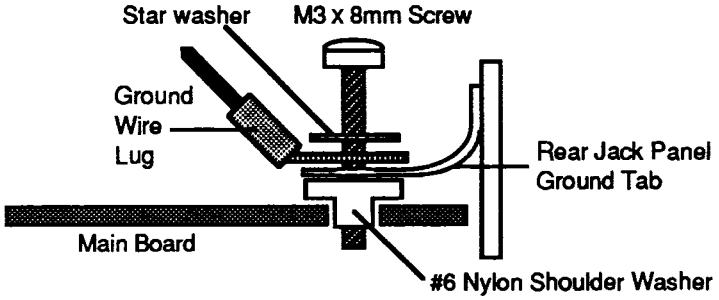
1. Carefully fit the front of the Lid into place and lower the back to a 45 degree angle.
2. Re-attach the Control Panel:
   a) Feed the Control Panel through its opening in the Lid and rest it in the opening.
   b) Lower the Lid into place making sure that the Speaker grills are on the outside of the Top Assembly and that the Control Panel ribbon cable is not being pinched.
   c) Place the Control Panel rear first into its opening.
   d) Push down gently but firmly on the corners of the Control Panel until it snaps into place.

3. Replace the six M4 x 13mm screws (see **Figure 10**) in the small holes in the front under side of the Top Assembly (see **Figure 7**, bottom view).
4. Replace six M4 x 46mm screws on each side of the Top Assembly (see **Figure 7**, bottom view).
5. Replace the seven M4 x 13mm screws on the back of the Top Assembly (see **Figure 7**, back view).
6. Replace one M3 x 6mm screw in the center of each Speaker grill (see **Figure 7**, back view).
7. Replace the music stand and re-connect the power cord.

SECTION C

Replacing the Main Board

1. Remove all cables connected to the **AWP**, including the Power cable.
2. Remove the Lid (see **Section A**). Be sure that the Foot Pedal cable is unplugged.
3. Remove the four M3 x 7.5mm self-tapping screws that hold the Main Board Shield in place (see **Figure 1**).
4. Disconnect the Keyboard (**J5**) and Control Panel (**J4**) ribbon cables and the Power (**J11**) and Amplifier (**J13**) Cables from the Main Board.
5. Remove the six M3 x 6mm screws (see **Figure 10**) from the Main Board.
6. Carefully remove the M3 x 8mm screw and star washer that holds the ground wire lug to the Main Board. Be sure to note if a nylon washer is present. Remove the Main Board.
7. With the replacement board tilted on a slight angle, insert the jacks into the holes in the rear panel.
8. To replace the ground screw, see **Figure 8**.
9. Replace the Main Board screws.
10. Connect the Keyboard and Control Panel ribbon cables. The striped edge of the Keyboard cable should be toward the left of the unit. The striped edge of the Control Panel cable should be toward the back of the unit.
11. Connect the Power and Speaker cables. Note that these cables are keyed. Re-connect the Foot Pedal cable.
12. Replace the Main Board Shield using the four screws.
13. Power up, test the unit, and re-attach the Lid (see **Section B**).



IMPORTANT!
REV 4 MAIN BOARDS MUST HAVE THE SHOULDER WASHER IN PLACE. REV A MAIN BOARDS AND HIGHER DO NOT NEED THIS SHOULDER WASHER.

FIGURE 8 - Main Board Gound Screw

SECTION D

Replacing the Control Panel Assembly

1. Remove all cables connected to the **AWP**, including the Power cable.
2. Remove the Lid (see **Section A**).
3. Remove the four M3 x 7.5mm self-tapping screws that hold the Main Board Shield in place (see **Figure 1**).
4. Disconnect the 20-pin ribbon cable from the Main Board at **J4** paying particular attention to polarity.
5. Disconnect the two black wires that come from the Power Switch.
6. Re-connect the ribbon cable from the new Control Panel to the Main Board (the striped edge of the Control Panel cable should be toward the back of the unit).
7. Re-connect the two black wires to the Power Switch.
8. Replace the Main Board Shield using the four screws.
9. Power up, test the unit, and re-attach the Lid (see **Section B**).

SECTION E

Replacing the Keyboard

1. Remove all cables connected to the **AWP**, including the Power cable.
2. Remove the Lid (see **Section A**).
3. Remove the four M3 x 7.5mm self-tapping screws that hold the Main Board Shield in place (see **Figure 1**).
4. Clip the cable ties that hold the main harness to the Keyboard.
5. Remove the twelve screws that attach the Keyboard to the base:
   a) From the top, remove two M4 x 9mm screws (see **Figure 10**) from the front of the Keyboard and six M4 x 9mm screws from the back. Note that the two center screws may hold a Lid Support Bracket in place (see **Figure 1**).
   b) From the bottom, remove four M4 x 24mm screws from the front under side of the Top Assembly (see **Figure 7**, bottom view).
6. Disconnect the Keyboard Ribbon cable from the Main Board at **J5**, paying particular attention to the polarity.
7. Remove the Keyboard from the case.
8. While paying particular attention to polarity, remove the Keyboard Ribbon cable from the old Keyboard and install it on the new Keyboard.
9. Connect the Keyboard Ribbon cable to the Main Board (**J5**). Be sure that the cable lies flat beneath the Keyboard and is not pinched under the Keyboard frame.
10. Replace the twelve screws that secure the Keyboard to the base. Be sure to re-attach the ground wire and the Lid Support Bracket (if present).
11. Replace the Main Board Shield using the four screws.
12. Power up, test the unit, and re-attach the Lid (see **Section B**).

SECTION

F

Replacing the Power Supply Assembly

1. Remove all cables connected to the **AWP**, including the Power cable.
2. Remove the Lid (see **Section A**).
3. Remove the four M3 x 7.5mm self-tapping screws that hold the Main Board Shield in place (see **Figure 1**).
4. Disconnect the 6-pin connector (**J2**) and the 9-pin connector (**J1**) from the Power Supply Board. Note that these connectors are keyed.
5. Remove the two blue wires from the Transformer.
6. Remove the slotted screw on the negative side of the Very Large Capacitor (see **Figures 4 and 9**) to remove the ring lugs.
7. Remove the black wire that goes to the negative side of the rectifier (see **Figure 4**).
8. Remove the five M4 x 9mm screws (see **Figure 10**) and star washers that hold the Power Supply plate to the base.
9. Remove the Power Supply Assembly.
10. Remove the slotted screw from the new very large capacitor. Attach the ring lugs to the new Very Large Capacitor (see **Figures 4 and 9**) and replace the slotted screw.
11. Insert the replacement Power Supply Assembly and re-install the Power Supply screws and star washers.
12. Carefully re-connect the two cables to **J1** and **J2** of the new Power Supply Board paying particular attention to the alignment of pins and connectors.
13. Re-connect the two blue wires from the transformer and the black wire to the negative side of the rectifier (see **Figure 4**).
14. Replace the Main Board Shield using the four screws.
15. Power up, test the unit, and re-attach the Lid (see **Section B**).

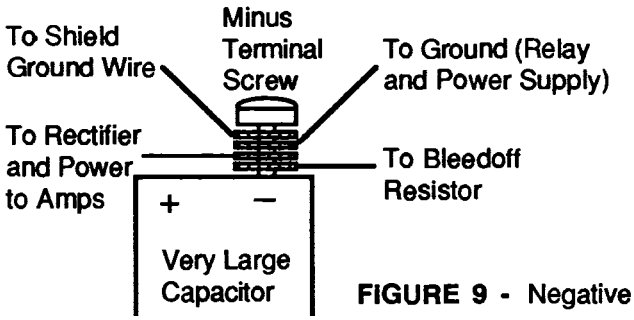


FIGURE 9 - Negative Terminal of Very Large Capacitor

SECTION

G

Replacing the Transformer

1. Remove all cables connected to the **AWP**, including the Power cable.
2. Remove the Lid (see **Section A**).
3. Disconnect all cables from the Transformer: the 6-pin cable to the Power Supply at **J2**, the blue wires to the Power Supply Fuse and Rectifier, and the green wires to the Line Filter and Power Switch.
4. Remove the four M4 x 9mm screws (see **Figure 10**) , star washers, and flat washers that hold the Transformer to the base.
5. Attach the new Transformer to the base using the four screws, star washers, and flat washers. Be sure to re-attach the ground wire.
6. Re-connect the cables as described in step 3 above (also see **Figure 2**).
7. Power up, test the unit, and re-attach the Lid (see **Section B**).

SECTION H

Replacing the Line Filter

1. Remove all cables connected to the **AWP**, including the Power cable.
2. Remove the Lid (see **Section A**).
3. Remove the 3 wire tabs connected to the back of the Filter, paying particular attention to the polarity.
4. Remove the two M3 x 9mm flat head screws (see **Figure 10**) that secure the Filter to the case.
5. Install the new Line Filter from the outside of the case using the two screws.
6. Re-connect the three wires to the Filter, again noting the proper polarity.

IMPORTANT! Failure to connect the wires to their proper posts can lead to a potential shock hazard (see **Figure 2**).

7. Power up, test the unit, and re-attach the Lid (see **Section B**).

SECTION J

Replacing a Speaker

1. Remove all cables connected to the **AWP**, including the Power cable.
2. Remove the Lid (see **Section A**).
3. Remove the three M4 x 16mm self-tapping hex screws that hold the Speaker in place.
4. Disconnect the two wires from the Speaker. Note that these wires are keyed.
5. Re-connect the two wires to the new Speaker.
6. Install the new Speaker into the housing using the three self-tapping screws.

IMPORTANT! When replacing a self-tapping screw, it is possible to over-tighten the screw and strip a hole in the case, making it necessary to replace the case. To prevent this, follow these procedures:

a) Before replacing a self-tapping screw, put a drop or two of LOCKTITE, Super Glue Gel, or RTV into the hole.
b) Install the screw, and tighten it only until the sub-assembly being attached is snug against the case. **Do not tighten the screws any further.** When the glue sets, the screws will hold the sub-assembly tightly in place.

7. Power up, test the unit, and re-attach the Lid (see **Section B**).

SECTION

K

Replacing an Amplifier

1. Remove all cables connected to the **AWP**, including the Power cable.
2. Remove the Lid (see **Section A**).
3. Remove the corresponding Speaker as described in Steps 3 and 4 of **Section J**.
4. To disconnect the Amplifier cable connector, lift the tab on the connector which is on the same side as the green and grey wires and pull firmly.
5. Remove the four M3 x 8mm screws (see **Figure 10**) that attach Amplifier to the base.
6. Attach the new Amplifier to the base using the four screws. *Do not overtighten these screws.*
7. Connect the 4-pin cable connector to the main harness. Note that the connector is keyed.
8. Connect the two cables to the Speaker, and re-install the Speaker as described in **Section J**.
9. Power up, test the unit, and re-attach the Lid (see **Section B**).

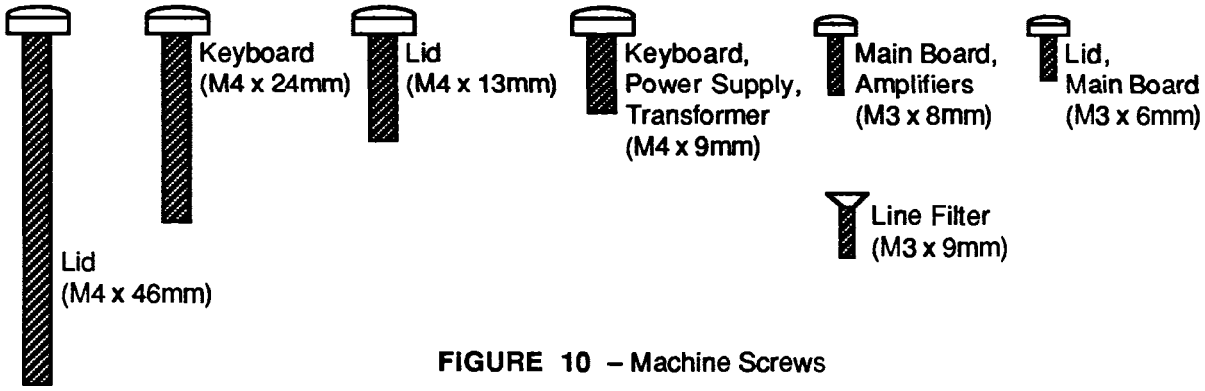


FIGURE 10 – Machine Screws

NOTES

NOTES

THE TECHNOLOGY THAT PERFORMS

In the U.S.: 155 Great Valley Parkway • Malvern, Pennsylvania 19355
Parts Ordering 1-800-441-1003

In Canada: Kaysound Imports Inc.
2165 46th Avenue • Lachine • Quebec, Canada H8T2P1
Parts Ordering 514-633-8877